

B1
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a second rotation shaft rotating relative to the first rotation shaft
and supported co-axially with the first rotation shaft;

a second rotor rotating with the second rotation shaft and having a
second number of magnetic poles that form a second magnetic field, the first
number and the second number being different, the first rotor and the second
rotor being disposed in series along the first rotation shaft;

a stator provided with coils each of which generates a first rotating
magnetic field in synchronism with the first magnetic field by application of a
first alternating current, and generates a second rotating magnetic field in
synchronism with the second magnetic field by application of a second
alternating current; and

a current control device that supplies a composite current
comprising the first alternating current and the second alternating current to
each of the coils.

B2
cont.
4. (Amended) A motor/generator comprising:

a first rotation shaft;

a first rotor rotating with the first rotation shaft and having a first
number of magnetic poles that form a first magnetic field;

a second rotation shaft rotating relative to the first rotation shaft
and supported co-axially with the first rotation shaft;

a second rotor rotating with the second rotation shaft and having a
second number of magnetic poles that form a second magnetic field, the first
number and the second number being different, the first rotor and the second
rotor being disposed in series along the first rotation shaft;

a stator provided with coils that generate a first rotating magnetic
field in synchronism with the first magnetic field by application of a first
alternating current, and generate a second rotating magnetic field in synchronism
with the second magnetic field by application of a second alternating current,
wherein the stator is disposed facing an outer periphery of the first rotor and the

B2
cmd's.

second rotor, and wherein the stator is provided with a plurality of core units separated in a peripheral direction, each core unit is provided with a first core facing an outer periphery of the first rotor and a second core facing an outer periphery of the second rotor and magnetically connected with the first core, and a magnetic reluctance between adjacent core units is set to be greater than a magnetic reluctance between the first core and the second core of the same core unit, and wherein each core unit is further provided with a third core magnetically connecting the first core and the second core; and

a current control device that supplies a composite current comprising the first alternating current and the second alternating current to the coils.

B3
cmd's.

6. (Amended) A motor/generator comprising:

a first rotation shaft;

a first rotor rotating with the first rotation shaft and having a first number of magnetic poles that form a first magnetic field;

a second rotation shaft rotating relative to the first rotation shaft and supported co-axially with the first rotation shaft;

a second rotor rotating with the second rotation shaft and having a second number of magnetic poles that form a second magnetic field, the first number and the second number being different, the first rotor and the second rotor being disposed in series along the first rotation shaft;

a stator provided with coils that generate a first rotating magnetic field in synchronism with the first magnetic field by application of a first alternating current, and generate a second rotating magnetic field in synchronism with the second magnetic field by application of a second alternating current, wherein the stator is disposed facing an outer periphery of the first rotor and the second rotor, and wherein the stator is provided with a plurality of core units separated in a peripheral direction, each core unit is provided with a first core facing an outer periphery of the first rotor and a second core facing an outer

B3
amcd.

periphery of the second rotor and magnetically connected with the first core, and a magnetic reluctance between adjacent core units is set to be greater than a magnetic reluctance between the first core and the second core of the same core unit, and wherein the first core comprises magnetic steel plates laminated in the direction of the first rotation shaft, and the second core comprises magnetic steel plates laminated in the direction of a periphery of the stator; and a current control device that supplies a composite current comprising the first alternating current and the second alternating current to the coils.

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cont.
9. (Amended) A motor/generator comprising:
- a first rotation shaft;
 - a first rotor rotating with the first rotation shaft and having a first number of magnetic poles that form a first magnetic field;
 - a second rotation shaft rotating relative to the first rotation shaft and supported co-axially with the first rotation shaft;
 - a second rotor rotating with the second rotation shaft and having a second number of magnetic poles that form a second magnetic field, the first number and the second number being different, the first rotor and the second rotor being disposed in series along the first rotation shaft;
 - a stator provided with coils that generate a first rotating magnetic field in synchronism with the first magnetic field by application of a first alternating current, and generate a second rotating magnetic field in synchronism with the second magnetic field by application of a second alternating current, wherein the stator is disposed facing an outer periphery of the first rotor and the second rotor, and wherein the stator is provided with a plurality of core units separated in a peripheral direction, each core unit is provided with a first core facing an outer periphery of the first rotor and a second core facing an outer periphery of the second rotor and magnetically connected with the first core, and a magnetic reluctance between adjacent core units is set to be greater than

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a magnetic reluctance between the first core and the second core of the same core unit, and wherein the stator is accommodated in a case that has a passage of liquid coolant, and supported inward by the case; and

a current control device that supplies a composite current comprising the first alternating current and the second alternating current to the coils.

10. (Amended) A motor/generator comprising:

a first rotation shaft;

a first rotor rotating with the first rotation shaft and having a first number of magnetic poles that form a first magnetic field;

a second rotation shaft rotating relative to the first rotation shaft and supported co-axially with the first rotation shaft;

a second rotor rotating with the second rotation shaft and having a second number of magnetic poles that form a second magnetic field, the first number and the second number being different, the first rotor and the second rotor being disposed in series along the first rotation shaft;

a stator provided with coils that generate a first rotating magnetic field in synchronism with the first magnetic field by application of a first alternating current, and generate a second rotating magnetic field in synchronism with the second magnetic field by application of a second alternating current, wherein the stator is disposed facing an outer periphery of the first rotor and the second rotor, and wherein the stator is provided with a plurality of core units separated in a peripheral direction, each core unit is provided with a first core facing an outer periphery of the first rotor and a second core facing an outer periphery of the second rotor and magnetically connected with the first core, and a magnetic reluctance between adjacent core units is set to be greater than a magnetic reluctance between the first core and the second core of the same core unit;

a magnetic shield surrounding an outer periphery of the stator; and

B4
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a current control device that supplies a composite current comprising the first alternating current and the second alternating current to the coils.
